

## Conservation of Energy:

- We are concerned with conservation of mechanical energy
- Kinetic and potential energies
- Energy is conserved when a closed system has no nonconservative forces acting in it
- Nonconservative forces:  
friction, drag

- Equation:

$$E_i = E_f$$

$$K_i + U_{gi} = K_f + U_{gf}$$

$$\frac{1}{2} \cancel{m} v_i^2 + \cancel{m} a_g h_i = \frac{1}{2} \cancel{m} v_f^2 + \cancel{m} a_g h_f$$

$$\frac{1}{2} v_i^2 + a_g h_i = \frac{1}{2} v_f^2 + a_g h_f$$

## Conservation of Energy Notes and Problem 4.17.12 CP Physics

A person throws a ball directly upwards with an initial velocity of 15 m/s. How high does the ball go?

$$v_f \text{ } \circ \text{ } - h_f = ?$$

~~0~~ m/s

$$v_i \text{ } \uparrow \text{ } \circ \text{ } - h_i = 0 \text{ m}$$

15 m/s

$$E_i = E_f$$

$$K_i + U_{gi} = K_f + U_{gf}$$

$$\frac{1}{2} v_i^2 = a_g h_f$$

$$h_f = \frac{v_i^2}{2a_g}$$

$$= \frac{(15 \text{ m/s})^2}{2(9.8 \text{ m/s}^2)}$$

$$= 11.48 \text{ m}$$